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METAL TREATING

September 1950

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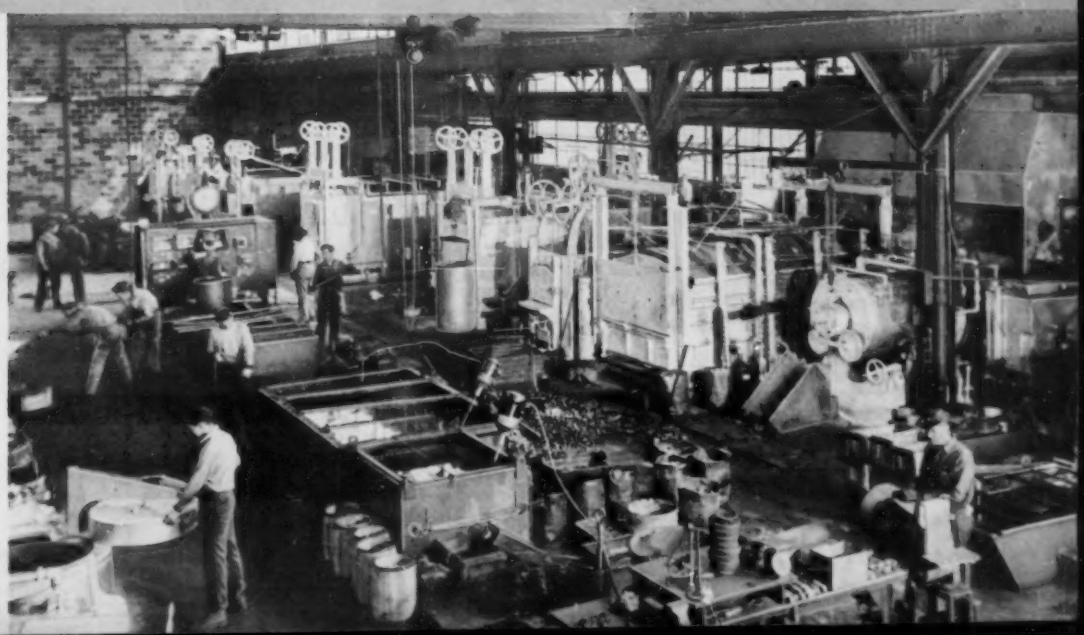
MTI MASTER CRAFTSMEN
METAL TREATING INSTITUTE

JOURNAL OF THE METAL TREATING INSTITUTE

National Trade Association of

COMMERCIAL HEAT TREATERS

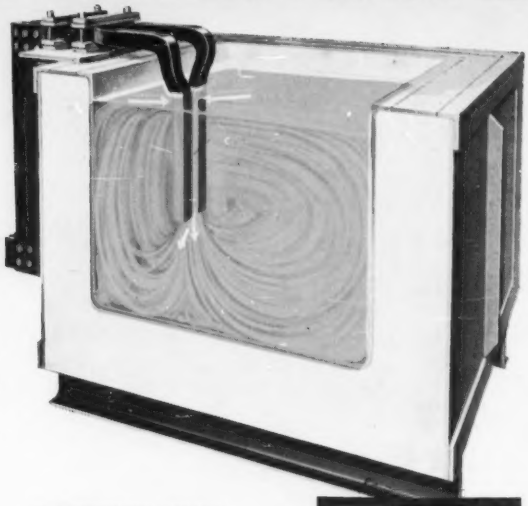
VIA



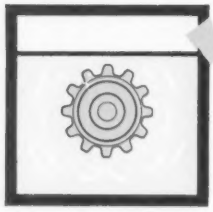
This view of the Queen City Steel Treating Co., Cincinnati, Ohio is representative of the modern equipment and production facilities available in today's commercial heat-treating plants.

THE MOST EFFICIENT HEAT TREATING PRINCIPLE

...for CARBURIZING • CYANIDE HARDENING • NEUTRAL HARDENING • ANNEALING OR HARDENING STAINLESS STEEL • BRAZING • HARDENING HIGHSPEED STEEL • AUSTEMPERING • MARTEMPERING • PROCESS ANNEALING • CYCLIC ANNEALING • DRAWING (TEMPERING) • SOLUTION HEAT TREATMENT • DESCALING • DESANDING • CLEANING

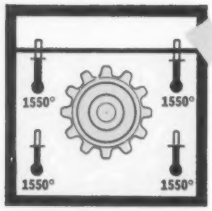


In the Ajax Electric Salt Bath, utilizing immersed electrodes, all heat is generated within the bath itself—the liquid salt acting as a "resistor". Electrodynamic forces produce vigorous circulation throughout the bath, in the *downward* motion indicated. This is precisely opposite to the *upward* thermal flow—dependent on a temperature difference in a bath—which exists in other salt bath furnaces. Only Ajax offers electrodynamic circulation!



RAPID HEATING BY CONDUCTION

The rate of heating depends only on the heat conductivity of the work itself. Thus, the Ajax Salt Bath Furnace heats work 4 to 6 times faster than a radiation type or forced convection furnace.



UNIFORM HEATING

The liquid salt completely surrounds the work and the automatic stirring action transmits uniform heat to all surfaces simultaneously. No other method delivers such heating uniformity—within 5° F. or *less* at any part of the bath.

NO ATMOSPHERE PROBLEMS

The Ajax Electric Salt Bath Furnace eliminates *all* atmosphere control problems. Scaling, oxidation and decarb are avoided. First cost of gas generating equipment as well as its operating expense are eliminated.

AUTOMATIC PREHEATING

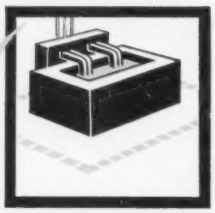
When a cold piece of metal is immersed, a "cocoon" of frozen salt forms around it instantly. This layer serves as a temporary insulator, preventing temperature shock and too sudden heating. The frozen salt melts in a minute or less and the work then heats rapidly to bath temperature.

BUOYANCY THAT MINIMIZES DISTORTION

Although the work sinks readily into the liquid salt, the bath nevertheless supports it to a marked degree. In effect, the work weighs appreciably less when immersed and this tends to prevent distortion and warpage.

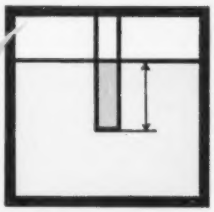
MORE PRODUCTION IN LESS FLOOR SPACE

Because an Ajax furnace heats work so much faster—and because it eliminates the need for atmosphere generators and similar bulky auxiliary equipment, a proportionately smaller amount of floor space is required to handle a given volume of work.



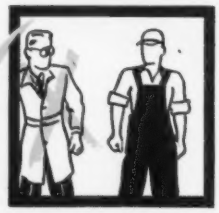
SELECTIVE HEATING

Because of its rapid heating rate, only that portion of the work immersed in the bath is heated. Just dip and treat *any desired portion* of any metal part or assembly.



NO SKILLED LABOR

Operation is so entirely automatic, so closely controlled by the Ajax furnace itself, that even an unskilled operator can handle full production.



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METAL TREATING

MASTER CRAFTSMEN
METAL TREATING INSTITUTE

Official Journal of the Metal Treating Institute

Editorial...

COOPERATION—LIFE BLOOD OF THE INSTITUTE

Someone has said: "When you would talk to me define your terms." "COOPERATION" has been defined as "the act of working together for the same end."

This seems to be a good definition because it is quite simple and its very simplicity makes one realize just how important cooperation is between individuals in companies and in the world itself. Its very importance is probably emphasized by its scarcity, for it is an unfortunate truth that among nations, groups and individuals, COOPERATION is indeed rarely if ever found.

The very existence, however, of an organization such as Metal Treating Institute indicates that there has been, at least at the time of its organization, some recognition of the values which can be provided by friendly and intelligent cooperation.

The decision to expand the opportunities for cooperation within the group is the regular publication of "Metal Treating" as the official journal of the Metal Treating Institute is a progressive step. It is fully intended that this journal will prove an important factor, developing not only good relations within the industry, but between its members and customers, and those many companies whose products are used regularly by the heat treating industry.

This first issue, and it is hoped many more to come, is an indication of successful cooperation — the cooperation of those who helpfully supplied editorial material and those advertisers whose confidence in the Institute and its journal has been expressed through their support of this new undertaking.

CONTENTS

SEPTEMBER 1950

FEATURES

The House That Heat Built 3

Radivection . . . Equated Heating 4
By Al. W. Davis

The Development of a Heat Treating Burden Rate 7
By C. G. Towne & Ray Sault

Low Viscosity Quenching Oil 18

Cold Working of Metals Simplified 9
By Horace C. Knerr

Super Scottsonizing 11
By C. U. Scott

Helping Your Customer Exercise Good Judgment 13

The Metal Treating Institute 21

DEPARTMENTS

Editorials 2

Thermo-Couplettes 10

Institute News 15

Personals 15

Hot Tips For Salesmen 16

Positions Wanted 13

Manufacturers' Literature 20

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Editorial . . .

A FORCE FOR PEACE

During World War II, enemy manpower always exceeded ours, but our loss of men was 315,000 compared with 1,600,000 for the enemy, a ratio of one to five.

General George Patton, with less than 250,000 men under his command, took more than 1,250,000 prisoners; again a ratio of one to five.

German generals, who considered themselves superwise in the art of war, repeatedly were so impressed by the over-whelming preponderance of American armament that they surrendered, rather than engage in a fight where they calculated the odds were hopelessly against them. As a consequence, countless American lives were saved.

What the Army calls "Retaliatory Potential" is a tremendous peace maker. It stops the enemy without a fight.

Everyone knows that our amazing war production was due largely to American genius for mass manufacture. Less obvious, but equally essential, was our capacity for swift and accurate solution of thousands upon thousands of difficult technical problems. Only those who have participated can appreciate the immense number and complexity of engineering details involved in the manufacture of even the simplest component of a projectile, an airplane, a military tank or a battleship to modern, exacting, military requirements.

Numberless conferences were held by war-time committees where experts spent many hours together, solving endless problems to assure faster and more accurate production of parts. Probably 90% of these headaches centered around physical behavior of metals and their heat treatment. The solution of millions of such metallurgical problems was at the foundation of military success.

Today, the most profound desire in the hearts of Americans is to preserve the peace so dearly won. We surely hate war. But evil forces are again at work in the world. If allowed to take their course, they will destroy something we value even more than peace, namely, our freedom as individuals and as a nation.

To preserve our peace and freedom, there is only one answer,—to be so strong that it would very plainly be folly to molest us.

We need plenty of that deterrent force—"Retaliatory Potential". In the hands of peace-loving Americans that can only be a protection, never be a threat to the world.

The science of metals has always been a basic element of civilized strength in peace or in war. America must be foremost in command of metals, their production, their treatment, and their application.

The many competent, experienced and well-equipped firms constituting the Metal Treating Institute, with plants in every important industrial area throughout the United States, are ready when called upon—without delay—to do a tremendous essential job in making America strong for peace.

H. C. K.

SOME FACTS ABOUT "METAL TREATING"

The only *Official* Journal *of the Metal Treating Institute.*

With the publication and circulation of this, the first issue of "Metal Treating", it seems appropriate to provide all those who will see this journal some facts about the background, purpose, circulation and character of the book as planned over many months.

It has taken nearly two full years to reach the stage of publication. Probably the best description can be had by abstracting statements made in the report of the Publications Committee as published in the Institute minutes earlier this year. These are quoted below:

I. Purpose of MTI Journal

To provide a house organ for the Metal Treating Institute, to be owned and controlled by the Institute, under the direction of an experienced editor, and supervised by a Publications Committee of MTI, responsible to the President and Board of Directors.

To promote the interests of the Metal Treating Institute and its members; to advance the art and industry of commercial heat treating; to create buyer interest and goodwill and indirectly educate the buying public to the advantages of commercial heat treating.

To serve the member companies of MTI with news, reports of activities, technical information, etc., and to give them material upon which to base sales arguments to their customers.

To enlarge Institute membership by interesting qualified commercial heat treating firms in the purposes of the Institute.

II. Circulation

The Journal shall have a small and highly selected circulation to insure that it reaches readers who are in the market for supplies and services sold by advertisers in the Journal.

III. Character of the Journal

To be limited to about 24 pages per issue, evenly divided between editorial matter and advertising. It is exceedingly important to keep each issue small, so that every page of editorial matter and of advertising will be seen and read.

The editorial contents are to include the following:

An editorial page directed to the commercial heat treating industry. To be educational and ethical in character. Feature articles are to be brief and to the point including technical material with regards to new steels, new treatment methods, new equipment and are also to include subjects of direct interest to

(Please turn to page 20)

"THE HOUSE THAT HEAT BUILT"

THE COMMERCIAL STEEL TREATING CORP.
DETROIT, MICHIGAN

Editor's Note:

The following story written and published some years ago is still today a fitting tribute to Ralph Hoensheid, former President of Commercial Steel Treating Corporation. (See Page 15) It will be of interest to all his friends to read again about his background and successful work.

Around the turn of the century, in a little Ohio town, a small boy squatted on a box by the forge in his father's blacksmith shop.

The fire, the hard-breathing bellows, the glowing iron, the steaming sizzle of hot metal dipped in water fascinated him.

When, in 1904, his father abandoned blacksmithing and took the family to the big city of Detroit, the boy found other interests. He grew up in the automobile era, which made blacksmithing unimportant. But the busy new world still needed the solid core of the blacksmith's art —the power of fire over steel. And the blacksmith's son used this power to build a Detroit industrial plant.

The boy was Ralph Hoensheid. The plant he later established stands today on Tireman Avenue near Livernois—the Commercial Steel Treating Corporation, one of the largest commercial heat-treating plants in the world.

Its development is connected logically with the blacksmith shop in Ohio.

When the smith, Anthony Hoensheid, brought his family to Detroit, he joined a tool company and applied the skill gained at his forge to heat treating twist drills, reamers and other cutting tools.

Ralph Hoensheid's interest in heat treating arose from association with his father. It dates from about 1912, when he prepared a time-temperature chart from

(Please turn to page 12)

Materials & Methods

#1 source of information on the properties and heat treatment of MATERIALS !

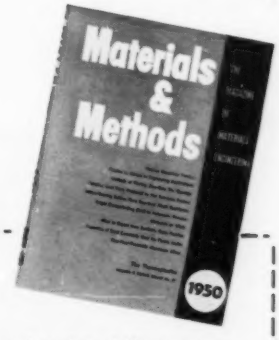
No other technical publication serving the metal-working industries has published as many "firsts" on methods for changing or improving the properties of engineering materials used in product manufacture.

That MATERIALS & METHODS' editorial content is important and valuable to materials engineering men is amply demonstrated by the fact that this magazine's circulation is the highest in history. The June 1950 ABC statement shows the M&M audience has now grown to 18,066 paid subscribers . . . up 20 per cent in two years!

M&M is world-famous for its Materials & Methods Manual Series for which over 130,000 paid reprints have been sold to date. Some of these outstanding Manuals are:

#6 —Heat Treatment of Steel — 16 pp.
#18—Induction Heating of Metals — 12 pp.
#24—Salt Bath for Metals — 16 pp.
#36—Steel Heat Treating Processes and Equipment — 12 pp.
#53—Controlled Atmospheres for Metals — 10 pp.
#63—Heat Resistant Castings — 16 pp. (To be published in October, 1950)

A limited supply of these Manuals is available at 25c per copy.



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Radivection... EQUATED HEATING

By AL W. DAVIS
Standard American Engineering Co.
Lyons, Ill.

"Radivection"* is an advancement in heat treating furnace design for utility use at temperatures from 250 degrees F. to 1750 degrees F. Employment of a new system of heat transfer results in improved temperature uniformity during both the heating and heated stages of a treatment. Economy in operation and increased production are achieved by advantageous use of combined radiation and convection heating methods.

In all industrial furnaces employing forced convection to any degree, the efficiencies of the means of heat transmission, radiation and convection, are inconstant. They vary in relation to the furnace operating temperature. As the operating temperature increases, radiation transfer efficiency increases; but convection transfer efficiency decreases in proportion.

These contradictory tendencies of the heat transfer media are detrimental to the maintenance of temperature uniformity between work most proximate to the heating source and that more distant from the source of heat, especially during the heating stage. In densely loaded work, obtaining temperature uniformity becomes even more difficult.

(A reading from a single thermocouple is generally misleading in that it indicates the temperature of a certain part of the work load but conveys no information as to uniformity of heat distribution. A thermocouple placed too near the various heat sources, as

* Patent Pending

GAS FIRED RADIVECTION FURNACE
250° - 1750°F.

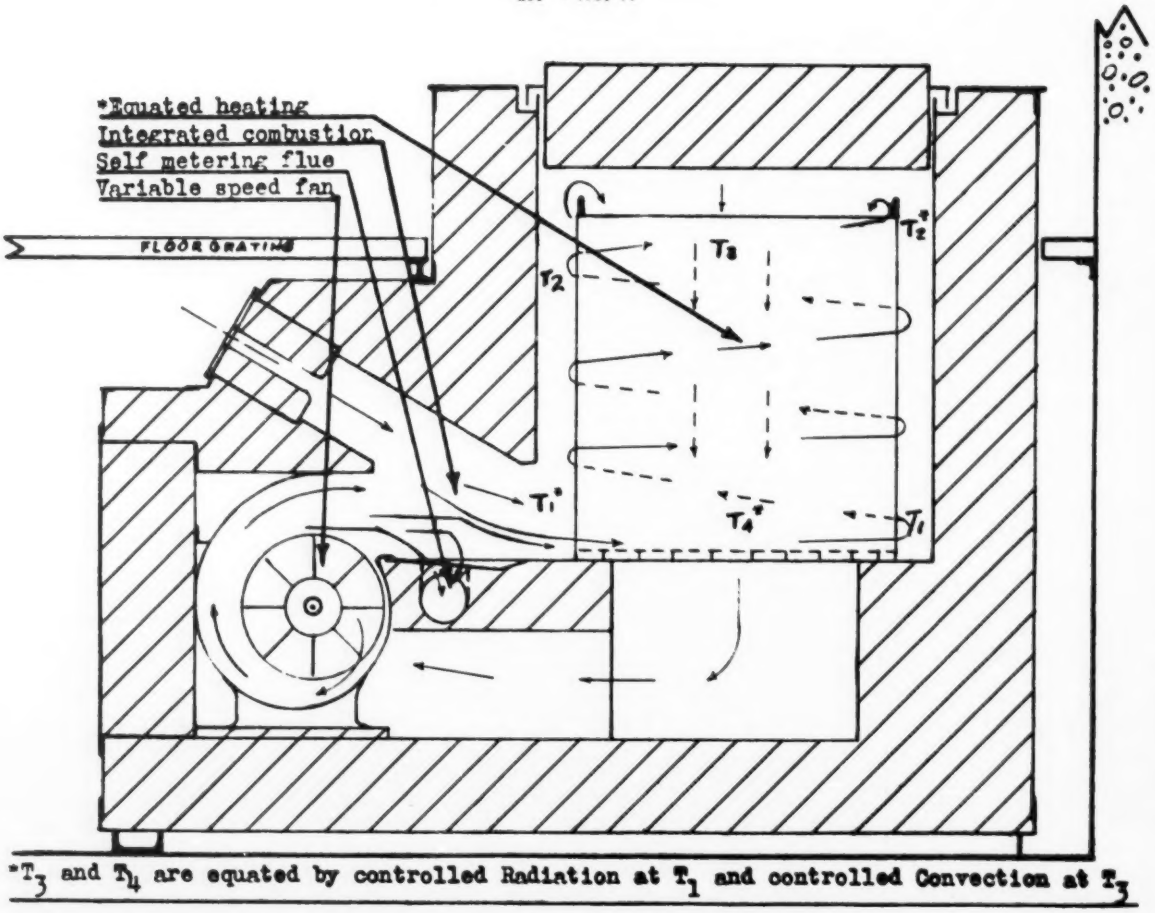


Figure 2 — Cross sectional view of "RADIVECTION" furnace

shown in Figure 1, would obviously give an erroneous impression. "Radivection" furnaces employ two thermocouples, each placed so that load temperatures are more accurately shown.)

The efficiency and therefore the production capacity of a furnace is dependent upon the length of time necessary to heat the load thoroughly. Temperature uniformity is the most important factor involved in accelerated initial heating and consequent reduction of the "soak" period. (See Figure 1.)

The "Radivection" furnace is engineered to provide equated heat distribution by utilizing to full advantage the divergent characteristics of the heat transfer media.

Equated heat distribution is the employment of folded (two pass) convection heating in conjunction with controlled volume and pressure of the heat carrier gases, introduced around and outside the work basket walls at the bottom only. (See Figure 2, T_1).

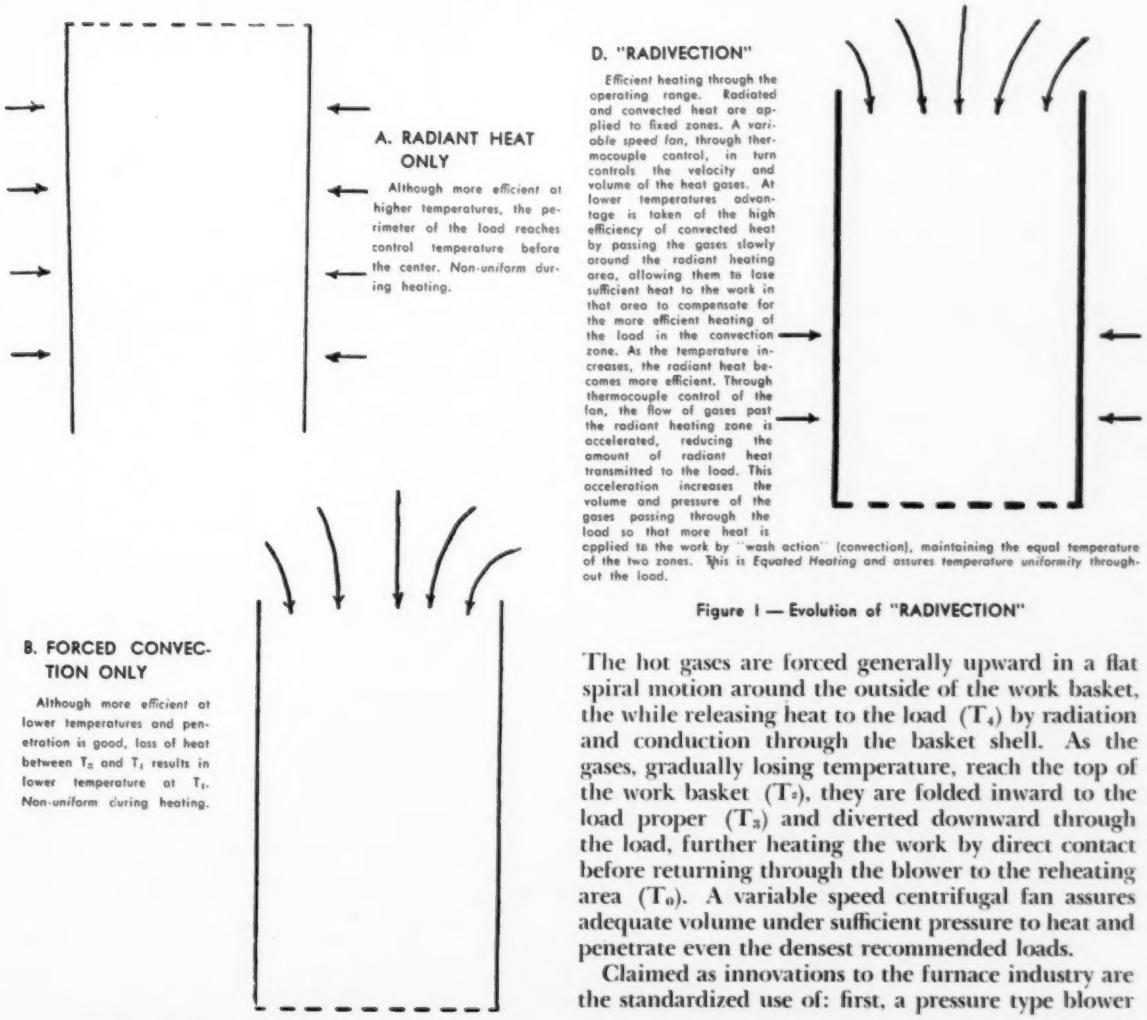

A. RADIANT HEAT ONLY
Although more efficient at higher temperatures, the perimeter of the load reaches control temperature before the center. Non-uniform during heating.
B. FORCED CONVECTION ONLY
Although more efficient at lower temperatures and penetration is good, loss of heat between T_2 and T_1 results in lower temperature at T_1. Non-uniform during heating.
C. COMBINED RADIATION AND CONVECTION
More efficient heating through the operating range, but lack of control over both heat mechanisms results in the steady application of heat to fixed zones by the heating media without regard to their varying efficiencies as the temperature increases. Non-uniform during heating.
D. "RADIVECTION"
Efficient heating through the operating range. Radiated and convected heat are applied to fixed zones. A variable speed fan, through thermocouple control, in turn controls the velocity and volume of the heat gases. At lower temperatures advantage is taken of the high efficiency of convected heat by passing the gases slowly around the radiant heating area, allowing them to lose sufficient heat to the work in that area to compensate for the more efficient heating of the load in the convection zone. As the temperature increases, the radiant heat becomes more efficient. Through thermocouple control of the fan, the flow of gases past the radiant heating zone is accelerated, reducing the amount of radiant heat transmitted to the load. This acceleration increases the volume and pressure of the gases passing through the load so that more heat is applied to the work by "wash action" (convection), maintaining the equal temperature of the two zones. This is Equated Heating and assures temperature uniformity throughout the load.

Figure 1 — Evolution of "RADIVECTION"

The hot gases are forced generally upward in a flat spiral motion around the outside of the work basket, the while releasing heat to the load (T_4) by radiation and conduction through the basket shell. As the gases, gradually losing temperature, reach the top of the work basket (T_2), they are folded inward to the load proper (T_3) and diverted downward through the load, further heating the work by direct contact before returning through the blower to the reheating area (T_0). A variable speed centrifugal fan assures adequate volume under sufficient pressure to heat and penetrate even the densest recommended loads.

Claimed as innovations to the furnace industry are the standardized use of: first, a pressure type blower

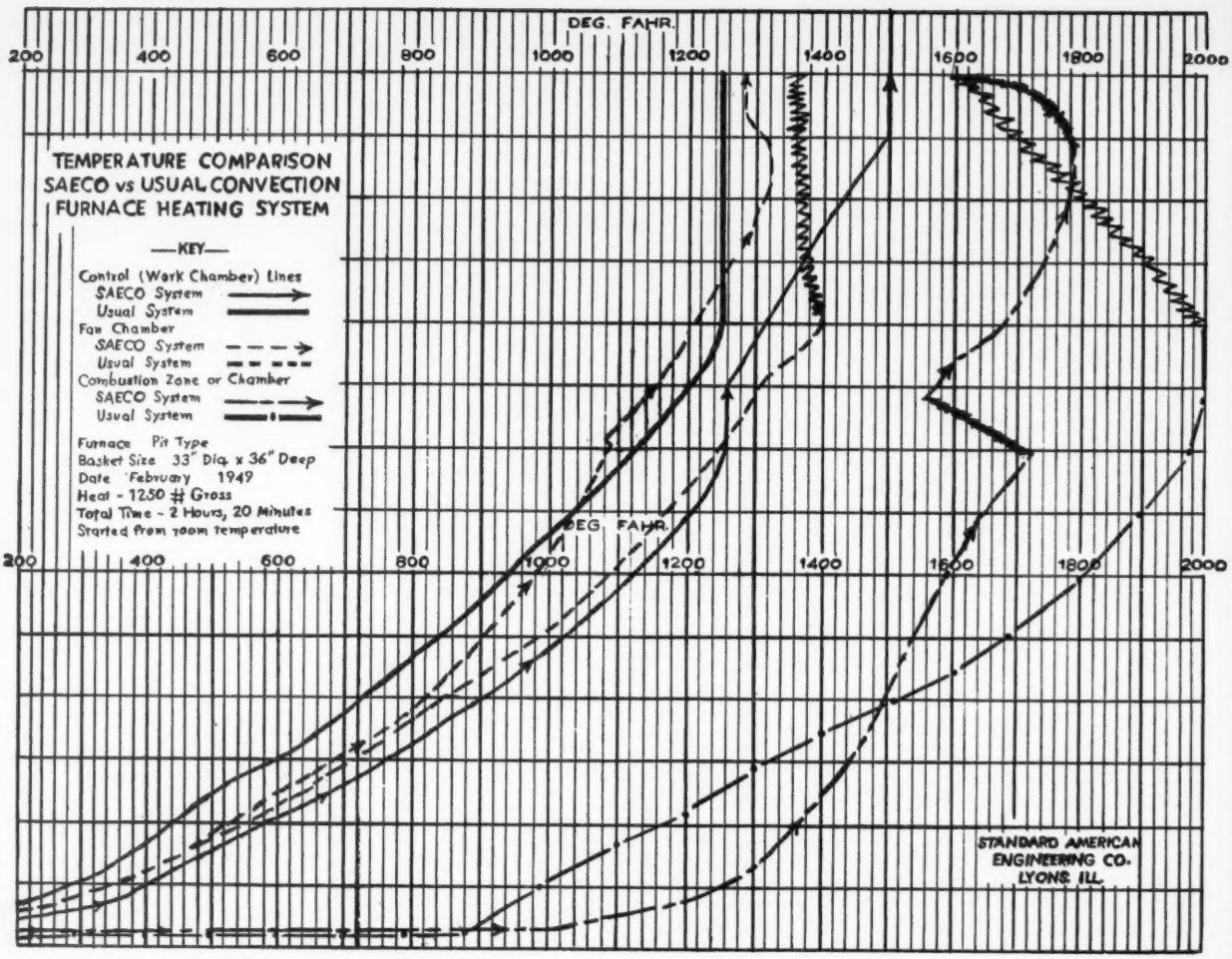


Figure 3 — Temperature comparison chart indicating advantages of "Integrated Combustion System"

for better heat penetration in a furnace employing radiation as a major heat transfer means; second, the use of a variable speed blower for purposes of controlling heat distribution.

In "Radivection" furnaces heated by combustion, an "integrated combustion" system, recently developed and incorporated in the furnace design, results in drastically reducing the operating temperature of the recirculating blower and avoiding use of a special refractory lined combustion chamber. (See Figure 3). The burner is placed in proper orifice angle relation to the pressure (discharge) side of the recirculating blower. A pressure drop at the fan outlet produces a negative pressure at the burner, which effects an aspirating action on the products of combustion. The burner products are rapidly drawn into the cooler gases from the recirculating blower, thereby minimizing flame temperatures.

Combustion at both main and pilot burners is stable. "Turn down" is excellent. Instantaneous mixing of fresh hot burner products eliminates the need for expensive higher temperature refractories.

This combustion method also features a "self-metering" flue, as part of the furnace construction. The flue is located in the mixing chamber wall, (See Figure 2, T_0), again in proper orifice angle relation to the blower discharge and in consideration of the burner position. Cooler gases are deflected out through the flue while the burner is firing. When the burner is off, the recirculating gases move past the flue opening, reducing flue action to very little or no movement in either direction.

This flue action reduces heat lossses resulting from constant "stack action." It retards oxidation or burning by preventing reverse stack action and makes dampers or smoke exhausting devices unnecessary for normal applications.

(Please turn to page 14)

The Development of a Heat Treating Burden Rate

By
C. G. Towne and Ray Sault
Porter Forge & Furnace, Inc.
Somerville, Mass.

Overhead or burden in Webster's terminology are those costs and expenses that cannot be charged to any one part of a business as rent, taxes, insurance, heating, lighting, etc. To get a true cost of operating any given piece of equipment those above mentioned expenses must be apportioned to each item of equipment in a manner that will correctly reflect the cost of operating that item and insure the management of a return of both cost and profit.

The Heat Treating Industry has a problem of cost that far exceeds the ordinary business in the fact that the commercial heat treater is selling a service and not a product. Service as we know it is performance which assists some cause or purpose. How can we measure performance when the same piece of metal that goes into the furnace is the same size and shape when it comes out? To the inexperienced nothing has happened but to the heat treater that metal may have been hard and was softened or it may have been soft and is now hardened. But what did it cost to make this change? To arrive at this cost it is necessary that we consider all expenditures that would in any way affect the operation.

1. Equipment and Installation

In starting our heat treating business it was necessary for us to purchase a tool steel hardening furnace at a cost of $2000. After setting this furnace in position in our plant preparatory to operating it was found that $500 additional had been spent for wiring, piping and other necessary details and equipment needed such as tanks, pumps, tongs, controls, etc. This $500 is added to the furnace cost and is capitalized. The manufacturer of the furnace advised with ordinary usage the equipment would last 10 years. On this information we would estimate the life of the furnace to be 10 years and depreciate it accordingly at 10% or $250 per year.

2. Allocation of Floor Space and Rent

To operate our business we have rented a one story building at a cost of $500 per month or $6000 per year. To find that portion of rent chargeable to our tool steel hardening furnace it is necessary to know the total area of our building and then the area needed for the successful operation of our furnace. After due calculations we find our building measures 2000 square feet and the furnace requires 200 square feet. Any area around the furnace for placing of auxiliary equipment, material, walking aisle area or any space necessary to the operation of the furnace is chargeable to the furnace. With this particular furnace we find 10% of our total area is applicable and therefore chargeable. In this case it is $600 per year.

If the business were operated in a building that was owned instead of rented, the floor space necessary for the equipment would be allocated in the following manner: Take the original cost of the building to the owner and estimate the life of the building. General practice depreciates a building in 25 to 50 years. To this add the taxes for the year. The depreciation and taxes are in reality rent which was allocated above. Floor space would still be the factor used to apportion the cost to each piece of equipment.

3. Allocation of Quenching Oil

As part of our additional costs of installation a 25 gallon oil tank was included. However, the oil needed for the tank for the year's operation must be figured. For ordinary operation it is estimated that 300 gallons of oil will be required for a year. At a cost of 20c a gallon we find $60 is expended.

4. Allocation of Employee Benefit Insurances

In the interests of better employee relations, hospitalization, accident, and sickness, and death benefit insurances are in effect for all employees. As the insurance rates are applied per individual we find that $50 per year is the cost to management for our tool steel hardener.

5. Allocation of Gas

In selecting this particular furnace one of the factors considered was gas consumption per hour. Gas consumption required per hour to produce proper temperature required for work going through this furnace is 50 cubic feet per hour. This figure was obtained from the manufacturer of the equipment with an additional check being made by the gas company with instruments for that purpose. Figuring the standard operating hours for the year to be 1800 hours we find 90,000 cubic feet of gas is consumed per year ($1800 \times 50 = 90{,}000$.) How 1800 hours were arrived at will be explained further along in the article. Checking our gas bill we find the rate is 65c per M cubic feet. Our annual consumption amounts to $58.50 which we will round off at $60. If the furnace was operated by fuel oil the cost would be figured in like manner.

Find the number of gallons of oil consumed per hour. This can be obtained by similar measurements as mentioned for gas. Multiplying the gallonage consumption per hour by the standard operating hours, we have obtained the total oil consumption for this piece of equipment. An additional calculation of the consumption multiplied by the cost per gallon will tell us the oil cost that would chargeable to this equipment.

6. Allocation of Electric Power and Light

Associated electric equipment installed with this unit amounts to equivalent to one horse power. We

find from a survey or test of this equipmennt we are consuming 1.90 K.W. per hour. With our 1800 annual operating hours we have an annual consumption of 3420 K.W.H. which we will round off at 3400 hours. Upon checking our electric bill, we find a rate of 2c per K.W.H. 3400 hours at a rate of 2c finds an electric charge of $68.

7. Allocation of Repairs — Labor, Material and Burden

During the lifetime of any equipment, particularly heat treating equipment, repairs must be made to keep it in first class operating order. In the particular case we estimate $150 will be spent for repairs during the year. However, if we were setting new burden rates after 4 or 5 years of operation we would have some past performance to make our estimates from.

In repairing the tool steel furnace, the *labor* of the maintenance man is charged to the furnace. Any *material* such as fire brick, new burners, angle iron, steel plates, or pipe used by the maintenance man in repairing would be allocated here. The *burden rate* of any equipment used by the maintenance man in repairing this furnace such as welding machines, power saw for cutting angle iron, or drill press for holes in the angle iron, or plate, would be charged to this allocation.

8. Allocation of Workmen's Compensation Insurance

The majority of states require employers to carry industrial accident insurance on all their employees. The operator of this furnace receives an annual wage of $3000 and we apportion an additional $500 to this equipment for executive and supervisory wages. The $500 additional for executive and supervisory wages is made up of a portion of the foreman, and superintendent's salary. These men are directly chargeable to the shop as their duties are strictly in relation to the shop. Their total salaries are one sixth of the total direct and indirect payroll of the shop. One sixth of the tool steel hardener's wages is $500. By checking our insurance invoice we find the rate per $100. It happens to be $2.86. $3500 multiplied with the rate shows $100 charged to the tool steel furnace. Again we rounded off the figures.

9. Allocation of Social Security Taxes

From previous allocation $3000 was paid to the operator and $500 additional apportioned for executive and supervisory salaries. At a tax of 2% $70 additional is charged to the equipment. In various states the rate will be different.

10. Allocation of Indirect Labor

Shipping, receiving, material handling and maintenance employees, vacation and holiday pay are charged to indirect labor. To find that portion of indirect labor applicable to the tool steel hardening furnace it is necessary first to find the total direct labor of the entire plant. In this set up it is $30,000. Our tool steel direct labor was $3000 so 10% of the indirect labor is chargeable to this equipment. Our indirect labor total is $5,000. 10% of the indirect labor of the plant is $500. Direct labor is all labor that is used on productive equipment.

11. Allocation of General Expenses

General expenses are items not specifically applicable to any piece of equipment but necessary to the operation of the business, such as wrapping paper, twine, light bulbs, asbestos gloves, sawdust, and other items of a similar nature. Our total general expenses for the year amounted to $10,000. To find that portion to be applied to this piece of equipment it is necessary that we know our total productive hours for the year. Upon investigation we find that grand total of production hours amounts to 30,000. From previous allocations we know the total steel furnace operated 1800 hours. This is 6% of the total. 6% of the total general expenses is $600 to be applied against this piece of equipment.

Reference has been made to 1800 hours as the annual operating hours. It is our intention to operate 52 weeks of 40 hours or 2080 hours annually. However, vacations and holidays reduce this by approximately 128 hours. Then for the purpose of covering ourselves in the event of any unforseen contingency we reduce it to 1800 hours or a shade better than 35½

(Please turn to page 17)

HEAT Treating SUPPLIES
NOW! With Quenzine
In the continuous effort to improve Beacon Quenching Oils, we discovered the revolutionary additive QUENZINE.
The results obtained indicate it is one of the greatest forward strides ever made by the industry, QUENZINE increases the quenching rate 50%, it gives deeper hardness, less distortion, low oxidation and sludging.
Write for more information.
The
J.W. KELLEY
Company
3401 W. 140th ST., CLEVELAND 11, O.
PHONE — Clearwater 1-3505
K

"Cold Working of Metals Simplified"

By HORACE C. KNERR
Metlab Company, Philadelphia, Pa.

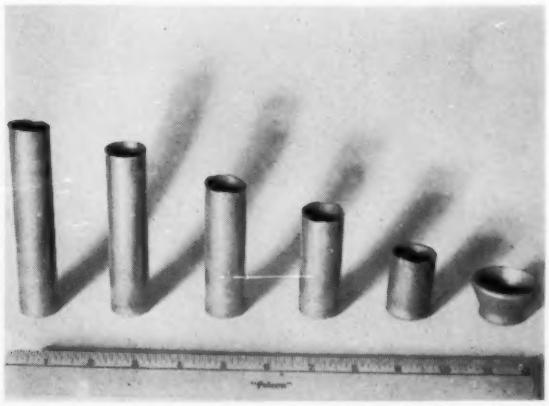
Metlab Co. in Philadelphia has developed a process whereby repeated annealing operations, with their accompanying pickling, rinsing, relubrication, and much handling, are eliminated, in the manufacture of steel parts which require a series of severe cold working operations through presses, draw benches, etc.

The originally annealed blank, cup, slug, bar, or tube is simply coated with pure lead, the lubricating effect of which is so remarkable that steel may be given heavy reductions as many as six or eight, or even more times without reannealing and without rupture. The trick is in causing the lead coating to adhere.

Lubricates at High Pressure

The hardness of most metals increases rapidly during the initial stages of reduction, and thereafter slowly, or not at all. Ordinary lubricants cease to be effective on hardnesses reached after the first or second pass, and the friction causes the metal to break. Reannealing is therefore necessary. But a pure lead coating retains its lubricating qualities under very severe die pressure and does not strip off; therefore cold reduction can be continued almost indefinitely. The lead can be chemically removed when desired.

The cost of preparing and lead coating the blanks is hardly greater than that of the first annealing and pickling operations. After this, the cost of subsequent annnealing and pickling, etc., is saved. Elimination of pickling by this process is only one of its many advantages. (Even though bright annealed, a steel surface must be pickled so that ordinary lubricants may adhere. This is not necessary with lead coating.)



FIVE PASSES WITHOUT REANNEALING.
Formerly Annealed After Each Pass

Processing Greatly Speeded, Inventory Cut

The parts may be moved directly from one press or draw bench to the next without returning them to the annealing and pickling plant. This represents a large saving in production and handling costs and greatly speeds up processing. Also it reduces the inventory of material in process. Decarburization, loss of metal, pitting—common results of repeated annealing—are avoided.

Lead, being a dry lubricant, is clean and safe to handle and does not pick up dirt or grit. Its resistance to corrosion makes it a valuable asset in shipping and storing.

The Metlab process, recently patented, must not be confused with other methods of metallic lubrication. An older method, involving the use of chloride of mercury, was abandoned because it was impractical. The addition of tin to cause lead to bond with steel greatly reduces lubricating qualities and permits only a couple of passes. The phosphate coatings, developed in Germany and this country, are less stable, require the addition of a suitable liquid lubricant and are subject to corrosion during shipment or storage.

Outlet for Commercial Heat Treater

While eliminating some possible annealing business for the Commercial Heat Treater, the process offers him a large new field for service. He requires only a lead pot of sufficient size to handle the small blanks, plus some small pickling and rinsing tanks. He would probably also take care of the initial annealing, which should be very thorough.

Metlab Co. is offering the process under favorable licensing terms to qualified commercial heat treaters as a service to metal working plants, who may thereby eliminate their annealing and pickling departments. Typical applications are deep drawn parts of many kinds, steel cartridge cases, wire, tubing, etc. It can be used with low carbon steels, alloy steels, stainless steels, and other metals.

DON'T FORGET

THE FALL MEETING
OF THE METAL TREATING INSTITUTE
WEBSTER HOTEL, CHICAGO
OCTOBER 19-22, 1950

THERMO-COUPLETTES . . .

DEEP FREEZE OF TOOLS HAS LIMITED BENEFITS

Shortly after the war, a procedure for refrigerating tools was introduced. This involves cooling tools to around minus 100 F, or even lower, during heat-treating operations.

The refrigerating of steel causes transformation of austenite, which is soft, to martensite, which is hard. This effect is especially noteworthy in the case of high-speed steels such as our Special HS and the high-carbon, high-chrome steels such as Lehigh H—which tend to retain large amounts of austenite.

It would appear that improved cutting ability should result from the refrigerating of these steels. In fact, the benefit usually claimed by deep-freeze enthusiasts is improved cutting ability, particularly with respect to high-speed steel.

However, it has been found that the normal tempering procedures we recommend for each type of steel will produce exactly the same result. In other words, when tools are properly heat-treated the refrigeration process adds nothing in the way of cutting ability.

Refrigerating does have real merit, however, in salvaging tools which are soft because of excessive retained austenite, due usually to very high quenching temperatures. After the refrigerating treatment, the customary tempering is necessary because of the martensite by refrigeration.

Refrigeration is also useful in connection with shrink fitting operations and in stabilization of high-precision gages. Stabilization of dimensions of gages is carried out by alternating tempering and sub-zero cooling parts, repeating this cycle six times. After this operation the gages will be stable in dimensions over a period of six years. This practice is used on precision gages which measure in millionths of an inch, and which otherwise tend to increase in dimensions over a long period of time.

From Bethlehem Steel Co. ("Tool Steel Topics")

Fresh Water O.K. for Chasers

Fresh water is all right for chasers, but don't use it for quenching tools.

Fresh water, regardless of its source, contains dissolved gases which make it unsuitable for quenching of tools. When tools are quenched in fresh water, gas is liberated at the surface of the tool. Gas pockets thus formed may prevent contact between tool and water to an extent that soft spots are produced as a result of ineffective quenching. Soft spots are undesirable, not only because of their low hardness, but because a quench which produces soft spots is also likely to cause cracking of the tools.

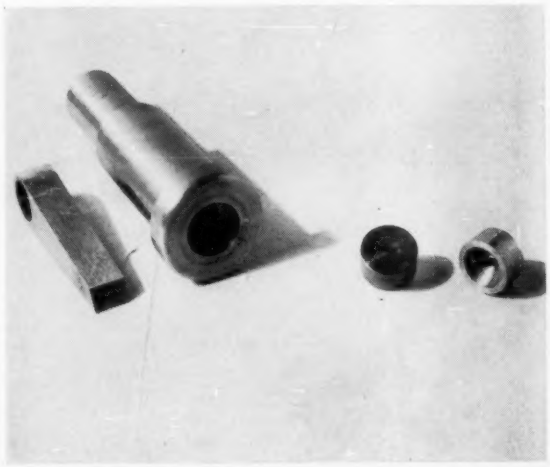
Soft spots, and tool cracking associated with soft spots, can be avoided by quenching in water which has been boiled to remove dissolved gases. If the water cannot be boiled, an alternative would be to quench a large amount of hot "dummy" material to expel the gases. Wherever possible it is preferable to use brine (about 10 pct) instead of water, as a further precaution against soft spots. Care should also be taken to expel dissolved gases from the brine solution before use. *From Bethlehem Steel Co. ("Tool Steel Topics")*

New Hardening Compound

Tools, dies, punches and other low carbon or high speed steel products are easily hardened to any required depth by means of Hard'N'Tuff compound, according to Doughty Laboratories, Inc., New York City.

Hardening procedure employed on carbon steel involves heating tool to cherry red color, dipping or rolling it in compound and letting latter fuse for 15 to 30 seconds. Tool is then reheated to cherry red color is quenched quickly in cold water or brine. If greater depth of hardness is desired, above steps can be repeated, except that additional compound is fused onto part before final additional heating and quench steps.

When hardening high speed drills and tools, a similar process is employed, only the object is brought to white heat and oil quench is employed. Laboratory tests indicate that hardness of 60 Rockwell C is produced on ½-in bars of 1020 low carbon steel.



WIRE TYING MACHINE PARTS. The large member at left of center is the Feed Tube through which the wire is fed. The small parts at the right are the Twisters that do the actual tying. The wire feeds through the countersunk under-side shown at the right, and emerges through the oblong slot in the Twister at the left. The Pawl shown at the extreme left, is for a ratchet that keeps the wire taut during the tying operation. These parts are subjected to extremely severe wear. The makers, Emmerich Machine Co., Brooklyn, N. Y. report that the Twisters and Pawls have increased life of more than 450% when hardened with HARD'N'TUFF Steel Hardening Compound.

SUPER SCOTTSONIZING

A Treatment of Stainless Steel

By C. U. SCOTT
C. U. Scott & Son, Inc., Rock Island, Illinois

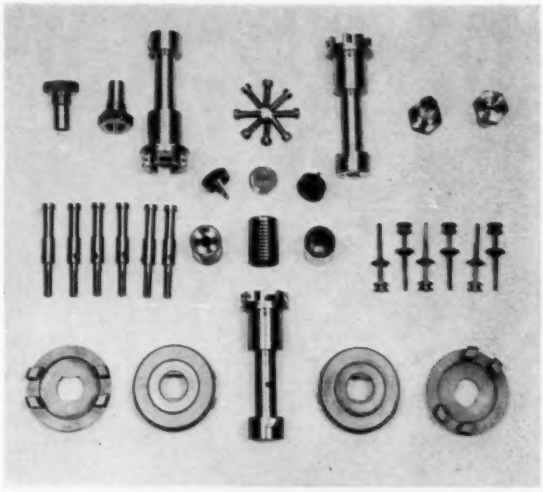
Editor's Note:

Charlie Scott, one of the original founders of the Institute sent along the interesting pictures and brief description of the processes which he developed. His cooperation is appreciated. The Editor hopes many more will do likewise.

Stainless steels normally are not considered as providing wearing qualities in their untreated state, and most are not intended to be subjected to hardening treatment. In fact, there is no treatment of any of the stainless steels except the 410 — 416 — 440 series that will add to their wearing qualities. However, we have found a treatment for the 18-8 series that gives a wearing surface that is far superior to wearing surfaces that are provided by any of the carbon or alloy steels.

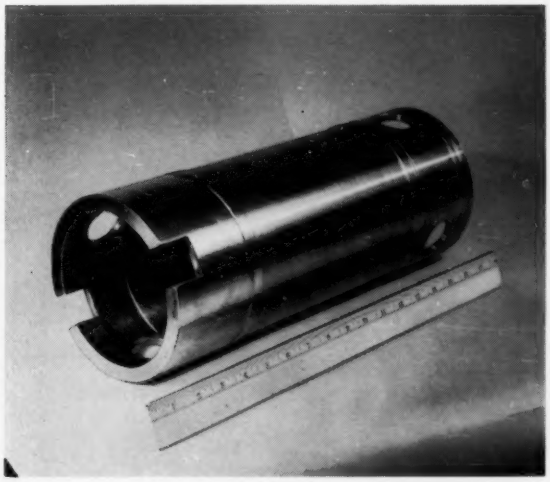
The surfaces of the hardened stainless steels have a wear resistance that has not been possible to produce on other materials. We have reports of tests where stainless has operated constantly for 1250 hours or over 52 days at 24 hours a day without lubrication. We have another report where hardened stainless steel continually operated for a period of 348 hours or 14½ days at 24 hours a day, and was still in good condition. The testing machine was worn out, so no further test was made. Previous test runs made had an endurance of from 12 to 15 hours.

The illustrations show a variety of parts that have been processed in our plant.



Valve control parts for jet propelling equipment produced from 416 series Stainless Steel, all Super Scottsonized.

These stainless steel roller bearing parts are provided greater wear resistance when subjected to the treatment. They require no final grinding.



Stainless steel casting used in equipment sold to the meat industry. For added wear resistance the part was Super Scottsonized and without grinding after processing was held to a dimensional tolerance of one ten-thousandth of an inch.

Say that you saw it in
"METAL TREATING"

The House That Heat Built

(Continued from page 3)

half-legible notes his father had scribbled.

This assignment aroused Ralph's curiosity. He began to ask questions. His father, of course, was pleased, and made every effort to help him.

The elder Hoensheid was an expert craftsman, who had accomplished much in heat treating despite the fact that the science of metallurgy was then comparatively undeveloped. An excellent teacher, he encouraged his son to find solutions to problems which even he could not solve.

Employment in the place where his father worked taught Ralph much, but it also raised more questions which no one seemed able to answer.

Appreciating that there could be no explanation of what heat does to a metal until he knew more about metals themselves, he enrolled in metallurgy courses at the University of Michigan. This training he supplemented by reading every book he could find on the subject.

Returning to the plant where his father worked, he helped develop a new type furnace with automatic temperature controls. With the aid of a microscope, which he persuaded the firm to buy, he carried out test after test upon metals. After months of experimenting, outside working hours, he evolved the complete data for heat treatment of the steels then most commonly used.

Such tabulated data eliminated guesswork. It helped assure uniformity of processing and results. It provided the kind of information needed for scientific production method.

In 1916 Ralph began buying equipment, and one year later he opened the Hoensheid Steel Treating Company on the south side of Fort Street near Nineteenth. His brother, his father and a friend helped.

The new firm was located first on Livernois near Warren Avenue, but was moved within a short time to its present site. Incorporated January 26, 1927 as the Commercial Steel Treating Corporation, it swiftly established itself as one of the most efficient heat treating plants in Detroit. Its speed and precision, and the uniform high quality of its work, soon earned it a wider reputation. This brought plant expansion. The war witnessed further growth in Commercial's business and its production facilities. Today it is one of the largest commercial plants of its kind.

America's feet have increased a full size during the past ten years, it has been reported. Nature must be trying to adapt us to carrying increasingly heavy tax burdens.

Say that you saw it in "METAL TREATING"

R-2

Interim Report

After a year of drastic use R-2 Quenching Oil is still hardening carbon and low alloy steel parts to greater depth and higher Rockwell than are obtainable with other oils. No changes have developed in its quenching ability or physical characteristics. It is still doing quenching jobs that are not possible with other oils.

Additional information and booklet upon request.

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RODMAN
CHEMICAL COMPANY
VERONA, PA.

HELPING YOUR CUSTOMER EXERCISE GOOD JUDGMENT

A problem which frequently faces many manufacturers involves reaching a decision as to whether to establish a Heat Treating Department or on some occasions purchase certain heat treating equipment in order to fulfill heat treating specifications on work going through the plant. An alert commercial heat treater is always ready with the facts and figures to help reach the proper decision in instances of this sort.

Recently a manufacturer considered buying a commercial cyanide pot at a cost of $1500.00 including installation, to heat treat for their requirements consisting of some sixteen different items weighing about 2 oz. to 2 lbs. each. The number of parts of one kind or size varies from 150 to 2,000 per year. The material was commercial low carbon steel.

Before placing their order for this pot furnace, their purchasing agent asked for a price on heat treating this material. He was concerned principally about the initial capital investment for the pot, a few thousand dollars, including controls, blower, installation, etc.

It was estimated that the total weight of the parts to be treated in one year would not exceed 2,500 lbs. At an average price of 10c per pound this would amount to a heat treating bill of $250.00 per year.

Obviously, the interest and depreciation on equipment would cost the customer more than this. Then he would have to have someone trained to do the heat treating as a side line in connection with his regular job; would have to purchase the necessary cyaniding mixture; arrange for cleaning the parts after heat treatment and for protecting them against corrosion until used. These items of direct cost would certainly far exceed the commercial charge for heat treating which in the present case would average only about $5.00 per week. Add the very important item of competent metallurgical supervision and testing of the work which is bound to be called for even in the simplest possible heat treating job, from time to time.

This is a very good illustration of the importance of investigating the cost of having heat treating done by a competent commercial plant before undertaking to install equipment. This, of course, is no reflection whatever upon the suppliers of furnaces, cyaniding salts, quenching oils, etc. for the private user when he has enough work to warrant it, but many such investments have been made without due consideration, which afterwards turned out to be a white elephant and reflected unfavorably upon the supplier due to high unit costs of production and a lack of knowledge to properly operate the equipment. Selling a furnace under these conditions where the application is economically unsound, clearly is not good business.

Intelligent advice based on knowledge of your business, its methods, costs and results will be welcomed at all times by your customer and when properly provided may create valuable goodwill and is in reality intelligent salesmanship.

POSITION WANTED

I am interested in either managing, or taking complete charge of a commercial heat treating plant. A brief summary of my education, experience, etc. will furnish you with some information concerning myself.

EDUCATION: Five years of college work with a B. S. degree in metallurgical engineering.

EXPERIENCE: Twelve years of diversified experience in governmental, commercial (8 years of commercial experience) and industrial plants covering the heat treating of ferrous and non-ferrous metals. Experienced in the heat treatment of tools, dies, production items, as well as being familiar with other heat treating processes. Acquainted with aircraft and ordnance work. Have had production and supervisory experience in various plants.

One year of editorial experience on the staff of The Iron Age.

PERSONAL HISTORY: Married, age 36.

SPECIAL PROJECTS: Heat Treating Guide Rule. Have a copyright on this Rule which contains approximately 4500 answers and will prove valuable to the forger, heat treater, design engineer and metallurgist in the determination of the correct processing temperature for the attainment of specific physical properties. Heat Treating Faults, Their Detection and Avoidance. This comprehensive survey of heat treating faults classifies both the defect and the resulting cause. This work was done with Dr. M. Balicki of The Polytechnic Institute of Brooklyn. Write Box PW "Metal Treating", 271 North Avenue, New Rochelle, N. Y.

Joe: I'm worried about my wife. She keeps talking in her sleep and saying, No, Frank; no, Frank.

Moe: Well, what the heck are you worried about—she said No, didn't she?

"My interest is purely professional, I'm a heat-treating expert."

Reproduced through courtesy of "Modern Machine Shop"

"—well, Jim, when I buy salt I expect service . . . and

I get both from Houghton

"I went through that business of trying to make up our own salts. And I shopped around for lower prices. But it didn't pay. We both know that although salt baths are an A-1 method of heat treatment, it takes experience to get the best results. So now I've come to rely on Houghton. They've had the experience, they treat me right, and their men have pulled us out of trouble many times, so I'm going along wth them. You'll be playing safe if you do, too."

"Thanks, George for the suggestion . . .

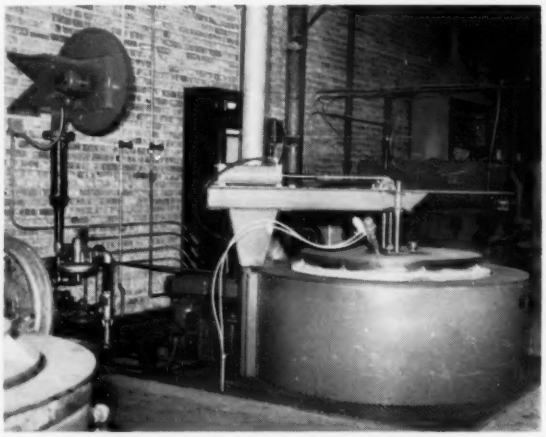
"We've bought a number of metal-working products from Houghton, and I know what you refer to, from the experience angle. I'd better put our salt bath problem up to them."—That's a sound decision; the many metal men who have made it were mighty glad they did. For salts, quenching oils and heat treating service you can rely on

E. F. HOUGHTON & CO.
PHILADELPHIA 33, PA.
and all principal cities

Radivection

(Continued from page 6)

The one furnace design is adaptable to various heat treating applications, such as hardening, annealing, normalizing, tempering, alumimum treating, etc., at temperatures from 250 degrees F. to 1750 degrees F. in three temperature ranges: 250 to 850 degrees F.; 250 to 1400 degrees F.; 250 to 1750 degrees F. Any of the more desirable temperature and power controllers may be engineered for the furnace to fit specific applications.



The RADIVECTION furnace illustrated was engineered and installed according to the user's specifications. Gas control apparatus and recirculating system, instead of being located as shown, can if desired be placed beneath the floor grating so that the operator works above the equipment. Flexibility, accuracy of control, and maximum efficiency are the objectives of any installation

Institute News...

Fall Institute Meeting—Chicago

The regular Fall meeting of the Metal Treating Institute is being held October 19-22, 1950 at the Webster Hotel, 2150 Lincoln Park West, Chicago, Illinois. As has been customary in the past, this meeting just precedes the opening of the National Metal Exposition of the American Society for Metals which is being held in the same city, thus permitting members who regularly attend this exposition to combine these activities.

The program will follow the usual procedures and will consist of Institute business sessions, technical sessions and the usual enjoyable social activities.

Next Spring Meeting

The 1951 Spring Meeting of the members of the Metal Treating Institute has been scheduled for the Hotel Colorado, Glenwood Springs, Colorado, May 30 to June 2.

Because of its central location it is expected that this meeting will bring out a large attendance, particularly from the West and Middle West members. As the map below shows, it is still readily accessible to Chicago and the East.

Begin to make your plans to attend now and write the hotel for your reservations.

PERSONALS

Ray Sault of Porter Forge & Furnace Inc., Somerville, Mass., sent us a booklet describing their plant, which is very well done and illustrates with many good pictures the wide variety of equipment and services available to their customers.

Mr. Ralph J. Hoensheid, Commercial Steel Treating Corporation, Detroit, Michigan died Friday, July 21, 1950. An ever active and co-operative member of the Institute, a a leader in initiative and in the presenting of constructive ideas to the industry, Ralph will be sorely missed by his many friends in the group.

James Colasanti of Metal Treating & Research Company, Denver, Colorado reports that they are heat treating a new-design fish hook for Soderberg & Kenyon. The hooks range in size from 1/8" to 5/16" in diameter. Another interesting job going through their plant involves heat treating sets of miniature gears for high-speed tachometers.

From C. F. Graham, Metal Treating Inc., Milwaukee (here is the kind of letter we like to get) we quote:

"As for news, it's hot as hell in our shop today and the damn conveyor broke on the Shaker Furnace.

"Had a ton of Draw Salt in storage a year; now it won't melt, full water, makes steam!

"Hired 5 men yesterday, 2 came to rest, 1 to work, 1 to talk and 1 didn't show. One applicant said he didn't come to look for work, he wanted the supervisor's job.

"We are out of Cadmium metal in our plating department; Uncle Sam has it again.

"Had five used pieces of equipment for sale two weeks ago. All sold today, must have a war starting some place.

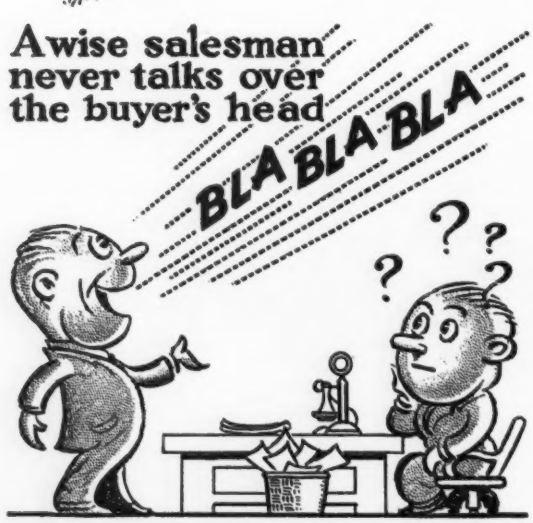
"The Milwaukee group—Thurner, Wesley, Supreme and Metal Treating will have their first fall meeting about Sept. 13th, 1950.

"This is all—and wish you success with the new venture, I am for it one hundred percent."

L-R Heat Treating Company announces the removal of its plant and offices to newly equipped and modernized quarters, 107 Vesey Street, Newark, N. J. Visitors are welcome at any time to inspect the new premises and equipment.

HOT TIPS FOR SALESMEN

ABSENT-MINDED SALESMAN, ISN'T HE?
OH-I DUNNO! HE DIDN'T FORGET TO WEAR A SMILE!
PRAIRIE PETE sez
BRAND YOUR SALES TALK with QUALITY!



A SALES TALK
HE'LL BE SURE TO HEED
IS ONE THAT'S
BASED UPON HIS NEED

Heat Burden Rate

(Continued from page 8)

hours per week. Some pieces of equipment like lead pots and sandblasts would not operate 1800 hours but considerably less. The same process of building up the burden rate would be used but the standard operating hours would be based on the operating hours of the equipment.

We are now prepared with the previous mentioned figurations to establish our burden or overhead rate for our tool steel furnace. It is important that all allocations be checked for accuracy of work as well as formula because an error can have two effects on the operation of the business. 1. An incorrect burden rate that is low will eventually lose so much profit for management that failure is inevitable. 2. An incorrect burden rate that is high will also lose business as your competitor with a better accounting system will profit by your inability to meet competition.

TOOL STEEL FURNACE BURDEN RATE

Equipment and Installation	$250
Floor Space and Rent	600
Quenching Oil	60
Employee Benefit Insurance	50
Gas	60
Electric Power and Light	68
Repairs—Labor, Material and Burden	150
Workmen's Compensation Insurance	100
Social Security Tax	70
Indirect Labor	500
General Expenses	600
Total	$2508

Annual hours — 1800

$\frac{2508}{1800} = 1.39$ Use $1.40 per hour

This $1.40 per hour rate is strictly a mythical rate arranged entirely for the purpose of showing how such a figure is developed. In the ordinary course of business to this would be added direct labor, administrative and selling expense, and profit before quoting a customer or figuring a job.

Administrative expense is all costs of executive salaries, office salaries and expenses necessary for administering the affairs of the business. Selling expense is advertising, salesmen's salaries, commissions and traveling expense. To find the amount to charge in figuring jobs, it is necessary to have a total of the administrative and selling expenses and find out what percentage of the total sales this is. For estimating purposes it is 15%.

A theoretical job based on the above computations would be figured as follows: A customer sends in 25 pieces of tool steel weighing 2 lbs. each and wants a 56-58 Rc. To meet the customers' specification it is necessary for the pieces to stay in the tool steel hardening furnace for 2 hours and, after quenching, in the drawing oven for 1 hour. The operator's time on this job is 1 hour.

2 hours at $1.40 Burden rate tool steel furnace	$2.80
1 hour at $1.20 Burden rate drawing oven	1.20
1 hour at $1.60 Operator's hourly rate	1.60
Total	$5.60

It is our intention to try to get a 15% profit. The $5.60 represents cost without administrative and selling expense or profit.

(Please turn to page 18)

Tempilstik®

the amazing Crayons that tell temperatures

A simple method of controlling working temperatures in:

- WELDING
- FLAME-CUTTING
- TEMPERING
- FORGING
- CASTING
- MOLDING
- DRAWING
- STRAIGHTENING
- HEAT-TREATING IN GENERAL

It's this simple: Select the Tempilstik® for the working temperature you want. Mark your workpiece with it. When the Tempilstik® mark melts, the specified temperature has been reached.

$2 each

gives up to 2000° readings

Available in these temperatures (°F)

113	263	400	950	1300
125	275	450	1000	1350
138	288	500	1050	1400
150	300	550	1100	1450
163	313	600	1150	1500
175	325	650	1200	1750
188	338	700	1250	1800
200	350	750	1300	1850
213	363	800	1350	1900
225	375	850	1400	1950
238	388	900	1450	2000

Also available in pellet or liquid form.

FREE —Tempil® "Basic Guide to Ferrous Metallurgy" — 16¼" by 21" plastic-laminated wall chart in color. Send for sample pellets, stating temperature of interest to you.

METAL & THERMIT CORPORATION

100 EAST 42nd STREET, NEW YORK 17, N. Y.

Cost = 70%	$5.60
A & S & Profit = 30%	2.40
Selling Price 100%	$8.00

$$\frac{\$8.00}{50 \text{ lbs.}} = \$.16 \text{ per lb.}$$

$$\frac{\$8.00}{25 \text{ pcs.}} = \$.32 \text{ ea.}$$

In this particular instance the customer would be charged on either a per pound or per unit basis whichever was the practice of the Management.

In reviewing the theoretical job one may see the importance of the burden rate and the need of its being correct. The effects on your business are many. It may mean the difference between operating at a profit with a good solid understanding of your cost structure and making prices to your customers which are sound being based on fact, or, taking guesses which are often found to be wrong and which can lead to loss or failure.

LOW VISCOSITY QUENCHING OIL

R-2 Quenching Oil, manufactured by Rodman Chemical Company, Verona, Pa., has been in successful commercial use for nearly two years. In carbon and low alloy steel it is reported to be producing greater hardness and depth of hardening than can be produced with other quenching oils, and doing it with less distortion.

R-2 is a low viscosity petroleum product with a flash point of 280 F. Low viscosity means less loss of oil by carryout. Low flash point, contrary to early fears, has meant no increase in fire hazard.

Through the courtesy of Pittsburgh Commercial Heat Treating Company, Pittsburgh, we are permitted to describe some of the many quenching jobs in which they have used R-2 advantageously.

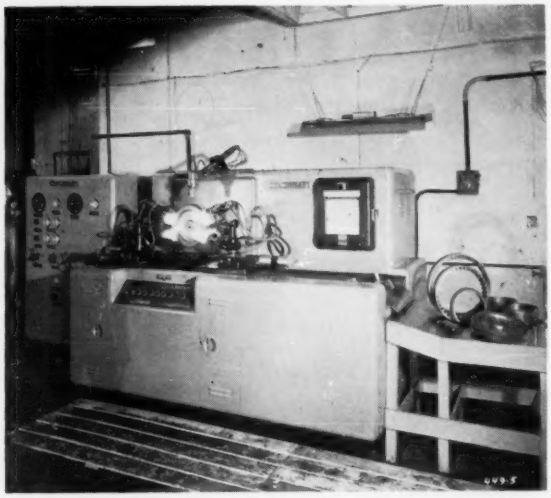
R-2 has relieved the hazards of quenching carbon tool steel dies, particularly when the dies have thick and thin sections or reentrant angles. Example: 5/16" grab hook trimming dies made of Crescent Tool Steel, weighing 10 lbs. each. Hardness wanted, 55/58 Rc. Quenched in R-2 and tempered to 57 Rc.

Following are examples indicating the wide range of work in which R-2 has been helpful.

Die holder, 54 lbs., SAE 1045, 3-3/8" x 8" x 14". Specified hardness 300/350 Brinell. Quenched in R-2, tempered at 850 F., final hardness was 321 Brinell.

Spindles, 3500 lbs. each, SAE 3150, 22" max. diam. Specified hardness 277-302 Brinell. As quenched in R-2, 418. Tempering at 1150 F. resulted in final 302 Brinell.

Roller bearing sleeves up to 18" diam. with cross section thickness 3/16" to 1" made from SAE 52100. Heated in neutral salt bath and quenched in R-2. Specified hardness 57/62 Rockwell C; final hardness 59/60 Rc. Although .025" was allowed for grinding after heat treatment, out-of-roundness was held to .006/.010".



12" Diam. spur gears, 6/8 pitch, 2" face, SAE 1045, automatically heated on Flamatic Machine and quenched in R-2. Total heating and quenching time, 3 minutes. Specified hardness 50/55 Rc. As quenched, 58 Rc, then tempered to 54.

OUR HEAVY DUTY

MOTORIZED OPERATOR atc

FOR 2-POSITION AUTOMATIC CONTROL

of valves and burners has been a real aid in many commercial heat treating plants. The unit operates from any standard pyrometer pressure gauge or any contact-making instrument having "H" and "L" control contacts.

Added to our line recently is a NEW series of Input Controllers which will break the full current input at regular intervals so that power is "On" for an exact portion of each minute.

Desired temperatures are held closely — and, at lowest cost. Power is conserved by using all of the current for heating. Write for new bulletin today!

TIMERS: STANDARD LINE AND SPECIAL

AUTOMATIC TEMPERATURE CONTROL CO., INC.

5212 PULASKI AVENUE • PHILADELPHIA 44, PA.

a cyclone was the hit of the show!

Back in '35 at the Amphitheatre in Chicago, Lindberg's CYCLONE Furnace was the hit of the show . . . because it brought to every heat treater a *new and better way to do his job!* The CYCLONE Furnace—our first product, was the first practical 100% forced convection furnace. It represents a basic improvement in existing equipment—it has never been successfully imitated.

Through the years we have grown in size and in the scope of the products we produce. We will have the products of eight divisions on display at this year's show—many of these products representing basic improvements in the tools of your trade.

on display:

HEAT TREATING FURNACES
MELTING FURNACES
HIGH FREQUENCY EQUIPMENT
ELECTRICAL EQUIPMENT
LABORATORY EQUIPMENT
AIR & HYDRAULIC EQUIPMENT
FABRICATION
AUTO ACCESSORIES

Be sure to see our exhibit—Booth #1204—National Metal Congress, Amphitheatre, Chicago, October 23—27, 1950

LINDBERG ENGINEERING COMPANY

2450 W. Hubbard Street • Chicago 12, Illinois

MANUFACTURERS' LITERATURE

Editor's Note:

The literature listed below contains information of interest to heat treating organizations. For your copy write direct to the manufacturer and be sure you mention seeing it reviewed in "Metal Treating".

* * *

"Proportioning Oil Burner"

Catalog No. 410, published by Hauck Manufacturing Company, 124-136 Tenth Street, Brooklyn 15, N. Y. A 24-page, well illustrated catalog, providing very complete information about various proportioning oil burners, automatic control systems, and ignition methods. Also includes a complete series of application illustrations.

"Induction Heating Units"

Bulletins T-1420 and T-1430 published by Lindberg Engineering Company, Chicago 12, Ill. describes two types of compact induction heating units, providing complete information on features, operation, applications and specifications.

"Induction Hardening and Heat Treating Results"

Catalog 22, Section B, published by Tocco Division, The Ohio Crankshaft Company, Cleveland 1, Ohio. The 12-page illustrated booklet provides a concise series of application stories collected from users of Tocco equipment showing parts, production time and cost data.

"Controlled Atmosphere Furnaces"

A 16-page booklet published by Delaware Tool Steel Corporation, Wilmington, Delaware. Well illustrated, it provides complete details including new temperature ranges available.

"Oil Cooling Equipment"

Catalog V-1146 published by Bell & Gossett Co., Morton Grove, Illinois, contains 16 pages of installation data and information about oil cooler selection; also oil recirculation charts for batch quenching.

"Industrial Furnaces"

Bulletin B-32, a 20-page folder providing typical installations of fuel fired and electrical heat treating furnaces and atmosphere equipment of the Drever Company, 748 East Venango Street, Philadelphia 34, Pa.

"Rotary Retort Furnaces"

Bulletin SC-147, a four-page bulletin published by Surface Combustion Corporation, Toledo 1, Ohio, concisely describes and illustrates design and application of types of rotary retort furnaces; gas generators for same and types of parts successfully treated.

"Brazing - Hardening - Preheating Torch"

Small brochure published by Duo-Flame Corporation, 39 West Broad St., Columbus 15, Ohio, describes a patented industrial torch, providing working temperatures of 2200°F for gas and compressed air. The torch is described as having a 500% range of adjustment without change of tips and is designed to burn practically any kind of gas.

FOR MANAGEMENT—An Interesting Reprint—"Business . . . Big and Small . . . Built America" by Benjamin F. Fairless, President United States Steel Corporation. This booklet reproduces the statement made by Mr. Fairless before the Subcommittee on the Study of Monopoly Power of the House Committee on the Judiciary. It is a concise (11 pages), effective and powerful statement which could well be used by all management to bring important truths to their personnel. Copies available upon request to Mr. J. Carlisle MacDonald, Assistant to Chairman, United States Steel Corporation, 71 Broadway, New York 6, N. Y.

Facts About "Metal Treating"

(Continued from page 2)

management such as costing, selling, estimating, personnel, labor, etc. When deemed of sufficient interest abstracts of such material appearing in other publications may be presented.

Institute news shall be a regular feature covering meeting programs, reports, committees, personal items and letters to the Editor. Feature articles will also be presented describing equipment, products or services rendered by those companies supplying the commercial heat treating industry.

IV. Advertising

It is planned that 12 pages of advertising monthly can readily be sold on a strictly business basis. All policies of "Metal Treating" are to be aimed toward providing maximum effectiveness in return for the advertisers.

For purposes of estimate, gross sales of 60 members of the Metal Treating Institute during a normal year may be conservatively estimated as about $12,000,000.00, or about $200,000 average per member.

Of this amount, approximately 25 per cent, or $3,000,000.00, is probably expended for supplies and equipment. This equals a $200,000.00 monthly market.

It must be strongly emphasized that advertisements in the Journal will have very direct reader appeal. Because circulation is small, the advertisements will be seen by those who actually have authority to purchase. . . .

As can be seen, this report clearly sets forth the careful thinking and planning which has been such an important part of the background of the establishment of "Metal Treating". Obviously the objective can be condensed to two goals:

(1) To make a real contribution to the field of published literature;

(2) To establish a tool for constant use in developing a better, stronger, more constructive Metal Treating Institute.

THE METAL TREATING INSTITUTE

ASSOCIATION OF MASTER CRAFTSMEN

Can you name a single product of modern industry made without the aid of heat treated metals? Remember the steel tools indispensable to agriculture, mining, manufacturing of every kind, ceramics, medicine, textiles, wood working, plastics, electronics, and art. Remember transportation on land, sea and air. Remember communication by telegraph, telephone and radio. Remember canning, packaging, bottling. Remember printing and advertising, to say nothing of modern mass production in the metal working field from bobby pins to atom bombs.

Beginning with the primitive maker of spears in a bellows-fed charcoal hearth, through the blacksmith of uncanny skill in the Middle Ages, up to the technically trained metallurgical graduate of today, the human race has leaned on its metal treaters for the basic sources of its food, shelter, defense, and the complex activities of living.

Today there are a small number of concerns in this country who are the modern blacksmiths of industry. They specialize in skilled heat treatment of metals for others. Some are large, many are small. Metal Treating Institute is the trade association of that vital group, the Commercial Heat Treaters. Its members are found in all parts of the United States—North, South, East, and West.

The Institute is young but not new, having been established in 1933. It is active and aggressive and constantly expands its services to its members and, through them, to the industrial public.

Membership is select and implies high standards of capacity, technical ability, and business integrity. Membership is open only to those commercial heat treaters who meet the strict qualifications set by the

MTI assumes a responsibility to the public. To belong, a commercial heat treating firm must show that it is sound, well-established, with adequate facilities and the necessary training and experience to successfully perform the work it undertakes.

Chapters are located in various industrial centers. Through local and national group meetings, members are kept abreast of the latest developments in the art. Statistical, industrial, and technical information is gathered and distributed through the national office.

Metal Treating Institute marches forward in peace and war, serving America.

THE MEMBERSHIP - 1950

Ace Heat Treating Co.
611 Grove Street
Elizabeth, New Jersey

American Metal Treatment Co.
Highway 25 and LaFayette Street
Elizabeth, New Jersey

American Steel Treating Co.
228 North LaSalle Street
Chicago, Illinois

Anderson Steel Treating Co.
1337 Maple Street
Detroit 7, Michigan

B-M Heat Treating Co.
220 Clifford Street
Newark 5, New Jersey

Bennett Steel Treating Co.
246 Raymond Boulevard
Newark 5, New Jersey

Chicago Steel Treating Co.
333 North California
Chicago, Illinois

Cincinnati Steel Treating Co.
Wooster Pike & Mariemont Avenue
Cincinnati 27, Ohio

Commercial Metal Treating, Inc.
89 Island Brook Avenue
Bridgeport 6, Connecticut

Commercial Steel Treating Co.
1225 Marquette Avenue
Cleveland 14, Ohio

Commercial Steel Treating Corp.
6100 Tireman Avenue
Detroit 4, Michigan

Commonwealth Industries, Inc.
5922 Commonwealth Avenue
Detroit 8, Michigan

Cook Heat Treating Co., of Texas
6233 Navigation Boulevard
Houston 11, Texas

Cook Heat Treating Corp.
5934 Alcoa Avenue
Los Angeles 11, Calif.

Dayton Forge & Heat Treat
2323 East First Street
Dayton 3, Ohio

W. J. Dunn Co., Inc.
524 "C" Street
Boston 10, Massachusetts

Dura-Hard Steel Treating Co.
2333 West Deming Place
Chicago 47, Illinois

Eklund Metal Treating, Inc.
721 Beacon Street
Love Park, Illinois

Getchell Steel Treating Co.
1106—10th Avenue S. E.
Minneapolis, Minnesota

Harris Metals Treating Co.
1745 Taylor Avenue
Racine, Wisconsin

Fred Heinzelman & Sons Co.
154 Spring Street
New York 12, New York

Alfred Heller Heat Treating Co.
391 Pearl Street
New York 7, New York

Hushek Metal Processing Co.
1536 West Pierce Street
Milwaukee, Wisconsin

Industrial Steel Treating Co.
600 Fallon Street
Oakland 7, California

L-R Heat Treating Co.
680 South 16th Street
Newark, New Jersey

Lakeside Steel Improvement Co.
5418 Lakeside Avenue
Cleveland 14, Ohio

Lindberg Steel Treating Co.
222 North Laflin Street
Chicago 7, Illinois

Maryland Tool Company
111-13 Hollingsworth Street
Baltimore 2, Maryland

Metal Treating & Research Co.
651 Sherman Street
Denver 3, Colorado

Metal Treating, Inc.
720 South 16th Street
Milwaukee 4, Wisconsin

Greenman Steel Treating Co.
284 Grove Street
Worcester 5, Massachusetts

Metallurgical Control Labs.
2226 East Lake Street
Minneapolis 7, Minnesota

Metallurgical Service Co.
1020 East Michigan Street
Indianapolis 2, Indiana

Metlab Company
1000 East Mermaid Lane
Philadelphia 18, Penna.

Metro Heat Treat Corp.
466 Broome Street
New York 13, New York

O. T. Muehlemeyer Heat Treating Co.
1531 Preston Street
Rockford, Illinois

New England Metallurgical Corp.
9 Alger Street
South Boston 27, Mass.

Ohio Heat Treating Co.
1100 East Third Street
Dayton 2, Ohio

Pearson Industrial Steel Treating
5757 Ogden Avenue
Chicago 50, Illinois

Perfection Tool & Metal Heat Treating Co.
1740 West Hubbard Street
Chicago 22, Illinois

Pittsburgh Commercial Heat Treating Co.
49th Street and A.V.R.R.
Pittsburgh 1, Penna.

Porter Forge & Furnace, Inc.
74 Foley Street
Sommerville 43, Mass.

George H. Porter Steel Treating Co.
1265-71 East 55th Street
Cleveland 14, Ohio

Precision Heat Treating Co.
216 William Street
New York 7, New York

Queen City Steel Treating Co.
2980 Spring Grove Avenue
Cincinnati 25, Ohio

J. W. Rex Co.
834 West Third Street
Lansdale, Penna.

Stanley P. Rockwell Co.
296 Homestead Avenue
Hartford 5, Conn.

C. U. Scott & Son, Inc.
1510 First Avenue
Rock Island, Ill.

Spindler Metal Processing Co.
2338 Mead Street
Racine, Wisconsin

Supreme Metal Treating Co.
4440 West Mitchell Street
Milwaukee 14, Wisconsin

Syracuse Heat Treating Corp.
1223 Burnet Avenue
Syracuse 3, New York

Thurner Heat Treating Co.
809 West National Avenue
Milwaukee 4, Wisconsin

Vincent Steel Process Co.
2424 Bellevue Avenue
Detroit, Michigan

Wesley Heat Treating Co.
1333 West Pierce Street
Milwaukee, Wisconsin

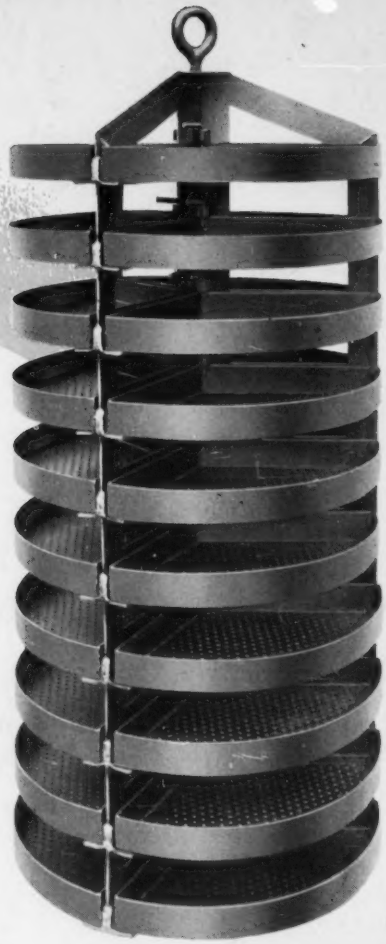
Wesley Metal Treating Co.
2320 Mead Street
Racine, Wisconsin

Wesley Steel Treating Co.
1301-1403 West Pierce Street
Milwaukee 4, Wisconsin

Wiedemann Machine Co.
4272 Wissahickson Avenue
Philadelphia 32, Penna.

Winton Heat Treating Co.
20003 West Lake Road
Cleveland 16, Ohio

Robert Wooler
Limekiln Pike
Dresher, Penna.



YOU CAN FIGURE ON 2 LABOR SAVINGS *with* "PSC" CARBURIZING FIXTURES

The rack pictured above is a typical example of how The Pressed Steel Co. is helping its customers, in two ways, to cut labor costs.

First, in parts handling. This fixture, with its removable trays, eliminated three complete handlings. The trays get their load of small parts at machine side. Without further handling they are trucked, carburized, quenched and then routed through finishing.

Second, because PSC welded alloy heat-treating equipment weighs 2/3 less than cast equipment, it handles easier and faster; in addition it requires less time to attain pot heat. A recent study of one customer's cycle showed a total saving of 5 hours.

Let our technical staff work with you in devising production savings. As pioneers of light-weight, sheet alloy heat-treating containers and fixtures, we make available to you a wealth of designing and production know-how. Whether you are installing new furnaces or need replacement equipment, let us send you information how PSC welded alloy units cut labor and fuel costs, and shorten heating cycles. We furnish standard or special welded alloy equipment in any size, and in any metal to meet your heat and corrosion requirements. Send blue prints or write as to your needs.

Light-Weight **Heat-Treating Equipment for Every Purpose**

Carburizing and Annealing Boxes
Baskets · Trays · Fixtures
Muffles · Retorts · Racks
Annealing Covers and Tubes
Pickling Equipment
Tumbling Barrels · Tanks
Cyanide and Lead Pots
Thermocouple Protection Tubes
Radiant Furnace Tubes and Parts
Heat, Corrosion Resistant Tubing

The PRESSED STEEL CO. PSC

THE PRESSED STEEL COMPANY

of WILKES-BARRE, PENNSYLVANIA

Industrial Equipment of Heat and Corrosion Resistant WEIGHT-SAVING *Sheet Alloys*

☆ ☆ ☆ OFFICES IN PRINCIPAL CITIES ☆ ☆ ☆